

# PATENT SPECIFICATION

397,744



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Application Date (in United Kingdom): Dec. 23, 1932. No. 36,516/32.

(Patent of Addition to No. 396,698. Convention Date (Germany): Feb. 4, 1931.)

Complete. Accepted: Aug. 31, 1933.

## COMPLETE SPECIFICATION.

### A Process for Working Fusion and Reduction Furnaces.

We, SOCIÉTÉ OXYTHÉRMIQUE, a Joint Stock Company organised under the Laws of the Grand Duchy of Luxemburg, of 10, Avenue de l'Arsenal, Luxemburg, Assignees of MATHIAS FRANKL, of 234, Ulmerstrasse, Augsburg, Germany, of German Nationality, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The subject matter of the present invention is an improvement in or modification of the process described in Application for Letters Patent No. 3238 of 1932. (Serial No. 396,698).

According to the process of this parent application, the fusion, or the reduction and fusion, in a shaft furnace with a fusion chamber which is widened in relation to the shaft, of solid substances with a high melting point is obtained by hot gases, preferably reducing gases, which circulate around a column formed by the substances to be fused—which column keeps itself up without resting on the vertical walls of the fusion chamber—and then pass into the shaft in contact with the charge which they heat up to its sintering point so that the charge forms a column which keeps itself up in the fusion chamber.

It has been indicated in the parent application that the process described in that application is advantageously applied to the manufacture of carbides of calcium and of silicon.

However, the mineral compounds which give rise to carbides have not generally the property of undergoing a sintering so that the formation of a column, which keeps itself up in the fusion chamber without resting on the lateral walls of this chamber, cannot be obtained without special measures which form the subject matter of the present application.

Moreover, in the manufacture of these carbides, if the shaft furnace is charged separately with the initial materials from which they are formed, the result cannot be obtained that the proportions of the mixture of lime and coal or of the mix-

ture of silica and coal always remain constant, which is a necessary condition for a perfect formation of carbides. Further, in that case the lime or the silica first of all fuses alone and only combines later with the coal; it is then necessary that a sufficiently large quantity of a liquid bath resulting from the fusion of the initial material be constantly maintained in the fusion chamber, but the liquid lime or silica, not combined with the carbon, attacks the lining of the furnace if it is of carbon even in the form of graphite and ultimately destroys this lining.

The object of the invention is to avoid these disadvantages and to enable a column to be formed which keeps itself up in the fusion chamber.

According to the invention, a furnace with a shaft of square or rectangular section and with a widened fusion chamber is charged with briquettes that are long or in the form of bars and are arranged in successive layers in such a manner that the briquettes of one layer lie across the briquettes of the next layer. These briquettes contain, finely ground and intimately mixed, the initial materials in the proportions required for obtaining the final product.

The length of the briquettes is at least twice their width, as for the bars, their length may be the length of the side of the furnace or a half of this length. On charging the furnace, the briquettes of a layer are arranged at right angles to the briquettes of the underneath layer in the manner of a brickwork structure. In this way, the column of materials to be fused can keep itself up in the enlarged fusion chamber without having undergone in the shaft a previous sintering.

On the other hand, owing to the briquetting of the initial materials which in each briquette are in the proportions required for obtaining the final product, there is also obtained the advantage of a lowering of the melting point, because the melting point of a mixture is always lower than the arithmetic means of the melting points of the constituents of the said mixture.

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The arrangement of the charge in the form of briquettes also gives the advantage of rendering the charge in the shaft more permeable to the gases owing to the small empty spaces existing between the briquettes.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

Process for working fusion and reduction furnaces according to the parent patent application especially for the manufacture of carbides, characterised by the feature that a furnace with a shaft of a square or rectangular section is charged

with briquettes which are long or in the form of bars and which are arranged in successive layers in such a manner that the briquettes of one layer lie across the briquettes of the next layer, these briquettes containing, finely ground and intimately mixed, the initial materials in the proportions required for obtaining the final product.

Dated this 23rd day of December, 1932.

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